

IN THE CLAIMS:

Please amend claims 1-20 to read as follows:

1. (Amended) A system for recovering potential energy from a pressurized gas fuel supply which is used to power a fuel cell within a vehicle, said system comprising:

a fuel tank for storing pressurized gas fuel;

a first conduit system for selectively and fluidly coupling said fuel tank to the fuel cell, and for allowing the pressurized gas fuel to be selectively communicated to the fuel cell;

an expander disposed within said first conduit system and which is selectively driven by the pressurized gas fuel, for generating torque and lowering the pressure of the pressurized gas fuel which is communicated to the fuel cell;

a second conduit system for selectively and fluidly coupling the fuel cell to a source of air, and for allowing the air to be selectively communicated to the fuel cell;

a compressor disposed within said second conduit system and which is selectively coupled to and driven by said expander, for pressurizing the air which is communicated to fuel cell; and

an electric machine operatively coupled to said expander and to said compressor, for selectively converting torque generated by said expander into electrical power, and for selectively converting electrical power to drive said compressor.

2. (Amended) The system according to claim 1, further comprising an electrical power source selectively coupled to said electric machine.

3. (Amended) The system according to claim 1, further comprising a bypass valve for causing the pressurized gas fuel to selectively bypass said expander.

4. (Amended) The system according to claim 3, further comprising:

at least one sensor for measuring at least one vehicle operating attribute and for generating a signal representing the measured vehicle operating attribute; and

a controller coupled to said bypass valve and to said at least one sensor, for receiving the signal and for selectively controlling the bypass valve based upon the value of the signal.

5. (Amended) The system according to claim 4, further comprising a switching module coupled to said controller and a plurality of electrical components, said switching module being selectively controlled by said controller to selectively transfer the generated power from the electric machine to one or more of said plurality of electrical components.

6. (Amended) The system according to claim 5, wherein said controller selectively and electrically connects said electric machine to said electrical power source by use of said switching module.

7. (Amended) The system according to claim 1, further comprising at least one pressure-reducing regulator disposed within said first conduit system.

8. (Amended) A system for supplying pressurized hydrogen gas and air to a fuel cell within a vehicle, said system comprising:

a fuel tank for storing the pressurized hydrogen gas;

a first conduit system for selectively and fluidly coupling said fuel tank to the fuel cell, and for allowing the pressurized hydrogen gas to be selectively communicated to said fuel cell;

a motor/generator for selectively converting torque into electrical power, and for selectively converting electrical power into mechanical torque;

a source of electrical power selectively connected to said motor/generator for selectively providing electrical power to said motor/generator;

an expander disposed within said first conduit system, and operatively coupled to said motor/generator, and which is selectively and rotatably driven by the pressurized hydrogen gas, for lowering the pressure of the pressurized hydrogen gas communicated to the fuel cell and for causing said motor/generator to produce electrical power;

a second conduit system for fluidly coupling the fuel cell to a source of air, and for allowing the air to be selectively communicated to the fuel cell;

a compressor disposed within said second conduit system, and operatively coupled to said motor/generator, and which is selectively and operatively coupled to said expander, said compressor being selectively and rotatably driven by said expander and by said motor/generator, for pressurizing said air within said second conduit system; and

a clutch for selectively connecting and disconnecting said expander and said compressor.

9. (Amended) The system according to claim 8, further comprising:

a bypass valve disposed within said first conduit system for causing the pressurized hydrogen gas to selectively bypass said expander; and

a controller connected to said bypass valve for selectively actuating said bypass valve, and for causing the pressurized hydrogen gas to selectively bypass said expander.

10. (Amended) The system according to claim 9, wherein said controller is further connected to said motor/generator for causing said motor/generator to drive said compressor when the pressurized hydrogen gas bypasses said expander.

11. (Amended) The system according to claim 10, further comprising:

a plurality of sensors for measuring vehicle operating attributes and for generating signals representing said measured vehicle operating attributes; and

wherein said controller is coupled to said plurality of sensors, and wherein said controller receives said signals and selectively actuates said bypass valve based upon the value of said signals.

12. (Amended) The system according to claim 8, wherein said compressor comprises a turbine.

13. (Amended) The system according to claim 8, wherein said expander comprises a turbine.

14. (Amended) A method for recovering potential energy stored within a pressurized gas used to power a fuel cell within a vehicle, said method comprising:

providing a first conduit system for transferring said pressurized gas to the fuel cell;

providing an expander;

operatively disposing said expander within said first conduit system;

providing a motor/generator for producing electrical power from torque and for producing torque from electrical power;

providing a second conduit system for transferring air to the fuel cell;

providing a compressor;

operatively disposing said compressor within said second conduit system;

operatively connecting said expander and said compressor to said motor/generator;

selectively connecting said expander and said compressor; and

channeling said pressurized gas through said expander so as to rotatably drive said expander, thereby selectively

driving said compressor and selectively causing said motor/generator to produce electrical power.

15. (Amended) The method according to claim 14, further comprising:

measuring a vehicle operating attribute;

selectively causing the pressurized gas to bypass said expander based upon said measured vehicle operating attribute.

16. (Amended) The method according to claim 15, further comprising:

providing a source of electrical power; and

connecting said source of electrical power to said motor/generator when the pressurized gas bypasses said expander, thereby causing said motor/generator to produce torque and rotatably driving said compressor.

17. (Amended) The method according to claim 16, further comprising the step of disconnecting said compressor from said expander when said pressurized gas bypasses said expander.

18. (Amended) The method according to claim 16, wherein said vehicle operating attribute comprises a pressure of the pressurized gas in a certain location within said conduit system.

19. (Amended) The method according to claim 16, wherein said source of electrical power comprises a battery.

20. (Amended) The method according to claim 19, further comprising the step of delivering the produced electrical power to said battery effective to recharge said battery.

Please add new claims 21-24 to read as follows:

21. (New) A method for operating a vehicle having a fuel cell system and at least one electric machine, the fuel cell

system being powered at least in part by a combination of air and pressurized gas fuel, the method comprising:

lowering the pressure of the pressurized gas fuel in order to operate the fuel cell system and recover an amount of potential energy from the pressurized gas fuel in the form of a mechanical driving force for the at least one electric machine; and

applying at least a portion of the driving force directly to the at least one electric machine to generate electrical power.

22. (New) The method according to claim 21, further comprising the step of using at least a portion of the generated electrical power to raise the pressure of the air in order to operate the fuel cell system.

23. (New) The method according to claim 21, further comprising the step of using at least a portion of the generated electrical power to power one or more vehicle electrical loads.

24. (New) The method according to claim 21, further comprising the step of storing at least a portion of the generated electrical power.

R E M A R K S

The Drawings

Applicants respectfully call the Examiner's attention to page 9, line 8 of the Specification. Reference numeral 82 refers to a shaft coupling clutch 84 and compressor turbine 20. As such, no drawing corrections are required.

The Specification